

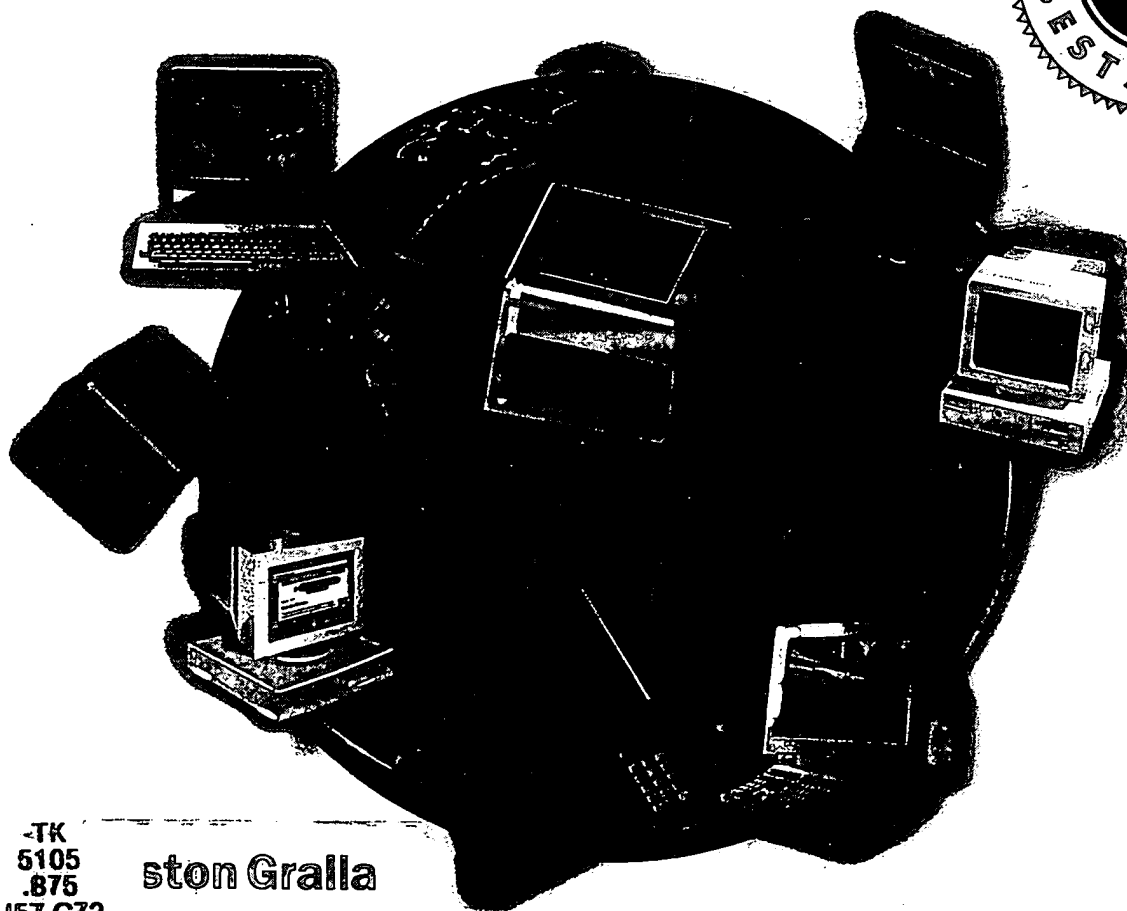


MILLENNIUM EDITION

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# HOW THE INTERNET WORKS



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JOE

Illustrated by SARAH ISHIDA,  
MINA REIMER, & STEPHEN ADAMS

# How the Internet Works

*Millennium Edition*

**Preston Gralla**

**que®**

01-19-01A09:59 RCVD

A division of Macmillan Computer Publishing, USA  
201 W. 103rd Street  
Indianapolis, IN 46290

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International Standard Book Number: 0-7897-2132-5

Library of Congress Catalog Card Number: 99-63011

Printed in the United States of America

First Printing: August 1999

01 00

This book was produced digitally by Macmillan Computer Publishing and manufactured using computer-to-plate technology (a filmless process) by GAC, Indianapolis, Indiana.

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**I**N the course of cruising the World Wide Web and clicking on a link, have you ever wondered, "How does that work?" Or perhaps this question popped into your mind while you were transferring a file to your computer via FTP, or reading a newsgroup message, or when you first heard about technologies such as spam, cookies, and firewalls. Maybe you've wondered how a message sent from your computer travels through the vastness of cyberspace and ends up in the right email box halfway across the world. Have you ever wanted to know how search tools find the exact piece of information you want out of the millions of pieces of information on the whole Internet? How can you listen to music and view animations while surfing the Web?

This book is designed for everyone interested in the Internet. Its guiding principle is this: No matter how much of a cyberpro you are—or how much of a novice—there's a lot you don't understand about the Internet. Here's just one small example. I have a friend who has made his living with companies involved with the Internet for many years. He's a complete cyberpro who lives and breathes the Internet. One day, he almost whispered to me, "I don't like to admit this, but I don't know what a proxy server is. How does it work, anyway?" He's not alone. The Internet changes so quickly and the technology advances so rapidly that it can seem almost impossible to keep up with all of it. If you're like just about everyone else involved in the Internet, your questions are similar to those of my friend. You'll find your answers here.

In Part 1, I explain the underlying basics of the Internet: who runs it, how TCP/IP works, how to understand Internet addresses and domains, and similar topics.

Part 2 covers the Internet's underlying architecture. Here's where you'll find out about things such as routers and how the client/server architecture underpins virtually every aspect of the Internet.

Part 3 depicts the various ways that you can connect your computer to the Internet. Here's where to turn if you're interested in any of the following topics: how a cable modem, Digital Subscriber Line (DSL), or ISDN works; how online services connect to the Internet; how you can connect by satellite to the Internet; how "palmtop" computers, such as 3COM's Palm, can browse the Web; and a host of similar subjects.

Part 4 covers every aspect of Internet communications. It shows how email and newsgroups work, how IRC chat works, what email "spam" is and what you can do to prevent it, how instant messaging works, and how you can use the Internet to make telephone calls anywhere in the world.

Part 5 covers what has become by far the most popular part of the Internet—the World Wide Web. You'll learn virtually every aspect of how the Web works. It delves into how browsers work, how Web server software works, and how Hypertext Markup Language (HTML) works. This section also covers the ways in which the Web is becoming integrated directly into your computer, how Web pages are published and organized on a site, and every other aspect of the Web that is likely to be of interest to you.

Part 6 takes a close look at common Internet tools. Here's the place to learn about basic tools and services, such as telnet, and what happens when you use FTP to download a file to your computer. You'll also learn how search engines and search tools work. And it's also the section of the book that covers cutting-edge Internet technology. You'll find out about how push technology works, how the Java and ActiveX programming languages work, how JavaScript works, how agents can silently do your bidding for you, and how the Common Gateway Interface (CGI) works, which is a little-known but vital part of the Internet.

Part 7 shows you how some of the most exciting parts of the Internet work—the various multimedia technologies. Whether you want to know how virtual reality or animations work, how streaming video works, how videoconferencing works, or how similar technologies work, you'll find it all here.

Part 8 covers intranets, how the Internet works with the outside world, and how you can shop online. We'll see how companies use Internet technologies to build their own private networks called intranets. And we'll take a close look at the underlying technologies that let you shop on the Web, which accounts for billions of dollars a year in sales.

Finally, Part 9 covers security concerns. It explains the controversial cookie technology that lets Web servers put bits of information on your hard disk and use that information to track you. It shows how firewalls work, how viruses can attack your computer, and how cryptosystems allow confidential information to be sent across the Internet. It delves into how hackers can attack Internet service providers (ISPs) by using so-called "smurf attacks." And it covers the issue of pornography on the Internet and shows how parental-control software can prevent children from seeing objectionable material.

P A R T

# WHAT IS THE INTERNET?

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**FOR** the first time ever, the world is truly at your fingertips. From your computer, you can find information about anything you can name or even imagine. You can communicate with people on the other side of the world. You can set up a teleconference, tap into the resources of powerful computers anywhere on the globe, search through the world's best libraries, and visit the world's most amazing museums. You can watch videos, listen to music, and read special multimedia magazines. You can shop for almost anything you can name. You can do all this by tapping into the largest computer network in the world—the Internet.

The Internet isn't a single network; it is a vast, globe-spanning network of networks. No single person, group, or organization runs the Internet. Instead, it's the purest form of electronic democracy. The networks communicate with one another based on certain protocols, such as the Transmission Control Protocol (TCP) and the Internet Protocol (IP). More and more networks and computers are being hooked up to the Internet every day. Tens of thousands of these networks exist, ranging from university networks to corporate local area networks to large online services such as America Online and CompuServe. Every time you tap into the Internet, your own computer becomes an extension of that network.

We'll spend the first section of this book defining the Internet. We'll also examine the architectures, protocols, and general concepts that make it all possible.

In Chapter 1, "The Wired World of the Internet," we will examine how the Internet runs. We'll look at who pays for the high-speed data backbones that carry much of the Internet's traffic, and at the organizations that ensure that standards are set for networks to follow so that the Internet can run smoothly. We'll also look at the various kinds of networks that are connected to the Internet.

Chapter 2, "How Information Travels Across the Internet," explains how information travels across the Internet and describes how hardware such as routers, repeaters, and bridges sends information among networks. It also shows how smaller networks are grouped into larger regional networks—and how those large regional networks communicate among themselves.

In Chapter 3, "How TCP/IP Works," we'll look at the Internet's basic protocols for communications and learn a little about basic Internet jargon, such as TCP/IP (short for Transmission Control Protocol and Internet Protocol). The chapter will explain how those protocols work and how special software such as Winsock enables personal computers to get onto a network originally designed for larger computers.



Chapter 4, "Understanding Internet Addresses and Domains," takes the mystery out of the Internet's often confusing addressing scheme. You'll learn about Internet domains and addresses and will even be able to make sense of them.

Chapter 5, "Anatomy of a Web Connection," covers the basics of what has become the most popular portion of the Internet—the World Wide Web. We'll look at the anatomy of a Web connection and see how hardware, such as Web servers, and software, such as Web browser client software, talk to one another and let you surf through the entire known world.

Chapter 6, "Internet File Types," will give you an understanding of the most common types of files you'll come across as you browse the Net. Compressed files, video files, graphics files—you'll learn about almost every kind of file you might encounter.

Whether you're a newbie or cyberpro, this section will teach you the basics of the Internet.



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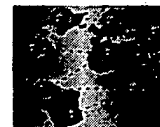
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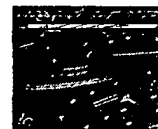
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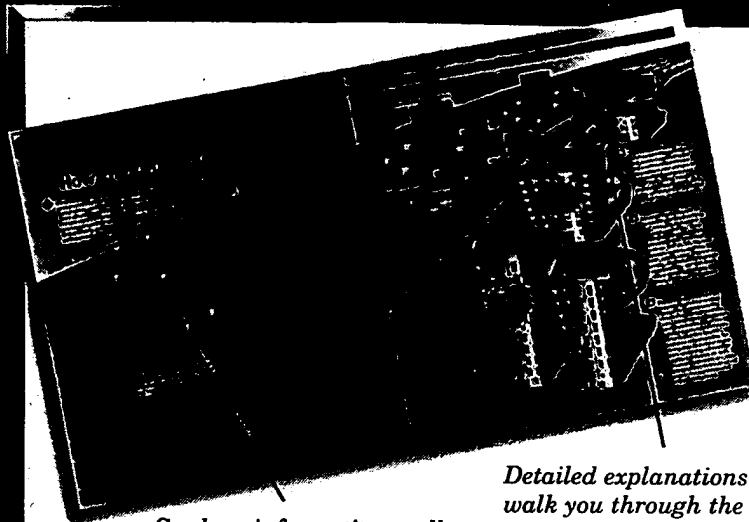


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